WHAT IS CLAIMED IS:

1. A process for generating a high-hydrogen, low-carbon monoxide gas, comprising:

admixing oxygen with fuel;

flowing said admixture through a gas purification stage;

catalytically oxidizing said admixture to form a hot gas;

flowing said hot gas through a gas generating device to bring said gas generating device to an operating temperature;

after said gas generating device is brought to the operating temperature, flowing at least one of a water and fuel mixture and an oxygen and fuel mixture through the gas generating device to form a product gas that contains hydrogen and carbon monoxide; and

flowing the product gas through said gas purification stage, thereby reducing the carbon monoxide fraction in the product gas.

2. The process according to Claim 1, wherein said product gas is generated by catalytic water vapor reforming of said water and fuel mixture.

3. The process according to Claim 1, wherein said product gas is generated by partial oxidation of said oxygen and fuel mixture.

4. The process according to Claim 1, wherein said reducing is by a selective CO oxidation on an oxidation catalyst.

5. The process according to Claim 1, wherein during a starting phase, the flow takes place through the gas generating device and the gas purification stage in a respectively reversed direction.

6. The process according to Claim 1, wherein during a starting phase, the flow direction in one of the gas generating device and the gas purification stage is maintained and only a sequence of the flow through said device and said stage is exchanged.

7. An apparatus for generating a high-hydrogen, low-carbon-monoxide gas, comprising:

a gas generating device for forming a product gas by at least one of catalytic water vapor reforming of a water vapor and fuel mixture and partial oxidation of an oxygen and fuel mixture;

a gas purification stage for removing carbon monoxide from the product gas by means of selective CO oxidation; and

feed and discharge pipes for reversing a flow direction through said gas generating device and said gas purification stage by way of valves.

8. The apparatus according to Claim 7, wherein during a starting phase, the gas generating device is arranged downstream of the gas purification stage and, after the conclusion of the starting phase, the gas purification stage is arranged downstream of the gas generating device.

9. The apparatus according to Claim 7, further comprising an oxygen feed pipe for adding oxygen into a fuel feed pipe at least during the starting phase.

10. The apparatus according to Claim 7, wherein the valves, are two-way valves, each connected with a pipe for feeding a fuel to either said gas generating device or said gas purification stage and each connected with a pipe for discharging a gas from said gas generating device or said gas purification stage.

11. The apparatus according to Claim 10, further comprising a control apparatus for triggering the two-way valves such that,

during a starting phase, said fuel feeding pipe to said gas purification stage and said gas discharging pipe from said gas generating device purification pipe are in a flow-type connection and,

after conclusion of the starting phase, said fuel feeding pipe to said gas generating device and said gas discharging pipe from said gas purification stage are in a flow-type connection.